

IN THE DRAWINGS

The attached sheet of drawings includes changes to FIG. 4. This sheet replaces the original sheet including FIGS. 3 and 4.

Attachments: 1 Replacement Sheet.

REMARKS

It is believed that the amendments presented above and the following remarks address each issue raised in both the Advisory Action mailed September 29, 2005 and the Final Office Action mailed July 12, 2005.

The Specification is amended for consistency with the drawings and with amended claims 2 and 12, in accordance with MPEP §2163.06, as further explained herein below.

The Drawings are amended to add reference number 55 to FIG. 4, to point out the endmost surface of pin head 54A. Applicants believe that no new matter is added, as this amendment serves only to apply reference number to an already-existing structure in FIG. 4.

Claims 2, 5, 10-12, 18, 21, 23, 24 and 26-29 are pending in the instant application, with claims 2, 12 and 18 currently amended (claim 12 was amended in Applicants' prior Response of September 12, 2005, but was not entered). Claims 26-29 were newly added in said prior Response but were not entered, and are therefore identified as "new". Claims 1, 3-4, 6-9, 13-17, 19-20, 22 and 25 are cancelled. Accordingly, claims 2, 5, 10-12, 18, 21, 23 and 24 stand rejected.

We telephoned Examiner Duong on October 21, 2005, to discuss the proper manner of presenting non-entered claims in this amendment. Per the Examiner's instructions, all claims are presented as if the Response of September 12 were never filed. In other words, non-entered claims are identified as "Currently Amended" or "New", as appropriate. Arguments presented in the Response of September 12 are reiterated herein.

Applicants' Prior Amendments and Examiner's Note Thereto

In the Response to Final Office Action filed September 12, 2005, Applicants amended claims 2 and 18 to recite a thermal transfer interface including a plurality of thermally conductive pins, with a flat front surface of each of the pin heads being substantially flush with the face. Claim 12 is amended to recite a thermal transfer interface including a plurality of thermally conductive pins with pin heads arranged in a geometric pattern covering an area extending beyond a region of contact between

the pin heads and the object, such that one or more of the pin heads outside a region of contact are non-contacting with the object.

In the responsive Advisory Action, the Examiner indicated that the amendments to claims 2, 12 and 18 raised new issues that would require further consideration. Additionally, the Examiner noted that the term "front" (claims 2, 18) is a relative term, and is therefore insufficient to overcome the cited prior art. The Examiner further stated that the term "a flat front surface" does not have any antecedent basis from the specification.

Amendments and Response to Examiner's Note

Claims 2 and 18: Pursuant the Examiner's advisory observation that "a face can be interpreted to be a front face or a rear face dependent on its relative location," "a flat front surface" is removed from claims 2 and 18. Claims 2 and 18 are thus amended to recite a thermal transfer interface which includes a spring element and a plurality of thermally conductive pins, each pin having a head and a shaft...wherein the spring element forms a layer with a substantially planar face, a flat endmost surface of each of the pin heads being substantially flush with the face.

This limitation is clearly supported by Applicants' FIG. 4. For example, the endmost surface of pin head 54A is depicted as flat and is substantially flush with the face of spring element 60.

We note that, pursuant MPEP §2163.06, "...information contained in any one of the specification, claims or drawings of the application as filed may be added to any other part of the application without introducing new matter." The amendment to claim 2 constitutes the addition of information at least from the drawings (e.g., FIG. 4) into the claims, and is therefore acceptable and in compliance with 35 U.S.C. §112, first paragraph. Applicants contend that the text "a flat endmost surface" may also be properly added to the specification, without introducing new matter. Therefore, for the sake of congruence, the specification is amended to include reference to the flat endmost surface.

Because the amendments made to claims 2 and 18 in the Response of September 12, 2005 were not entered, current amendments to claims 2 and 18 are

shown relative to the presentation of these claims in the Amendment and Response of April 19, 2005.

Claim 12: Claim 12 was amended in the Response of September 12, 2005 to recite pin heads arranged in a geometric pattern that covers an area extending beyond a region of contact between the pin heads and the object such that that one or more of the pin heads outside the region of contact are non-contacting with the object. This amendment was not entered by the Examiner, and is thus repeated herein.

The amendment to claim 12 constitutes the addition of information contained in both the drawings and the specification into the claims. Amended claim 12 is therefore in compliance with 35 U.S.C. §112, first paragraph. For example, Applicants' FIG. 2 shows a plurality of pin heads, with multiple pin heads that are non-contacting with the object. Applicants' specification collaborates this support for amended claim 12, reciting (in the description of FIG. 2) that "It is not necessary that every pin 12 thermally communicate with object 14." Specification p. 6, lines 6-7. No new matter is added.

Arguments in Support of Claims 2, 5, 10-12, 18, 21, 23 and 24

Claim Rejections - 35 U.S.C. §102

Claim 2 stands rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,226,281 ("Chu '281"), and claim 12 stands rejected under the statute as being anticipated by U.S. Patent No. 5,097,385 ("Chu '385"). We respectfully disagree with the Examiner's rejections of claims 2 and 12.

Claim 2: Applicants previously presented arguments that the spring element (36) in Chu '281 is not flush to any head of the pin (24). The Examiner found this argument unpersuasive, stating that "Chu '281 discloses (figure 6) that the lower planar surface of the spring element (36) is flush with a flat surface of the pin head (25)." Final Office Action, p. 2, ¶2.

Respectfully, we must disagree. Chu '281 shows a pin header 25 disposed between a "resilient material 36" and a chip 12. Chu '281 col. 4, lines 5-6; FIG. 6. This header 25 is not flush to the resilient material in the manner in which Applicants' pin head is flush to a face of a spring element. In Chu '281, resilient material 36 "is located between the housing 18 and the *back of the header 25.*" Chu '281, col. 4, lines

7-8, emphasis added. Further, the back of the Chu '281 header is not the endmost surface of the header, as is required by amended claim 2. See Chu '281, FIG. 6.

On the other hand, "In the configuration of [Applicants'] pin 54, a flat endmost surface of head 54A of pin 54 is coplanar with spring pad 60." Specification p. 7, ¶[0035], lines 11-12, as amended. As is clearly shown in FIG. 4, the flat endmost surface 55 of head 54A is coplanar with spring pad 60. See FIG. 4. This is different from Chu '281, wherein the back of a header is positioned next to a resilient material.

Chu '281 does not teach a flat, endmost surface of a pin head being flush with a spring pad, as required by amended claim 2. Chu '281 thus cannot anticipate claim 2 under 35 U.S.C. §102(b). Withdrawal of the Examiner's rejection, and allowance of claim 2, are therefore respectfully requested.

Claim 12: Claim 12 stands rejected as being anticipated by Chu '385. Regarding claim 12, the Examiner states "Chu '358 discloses figure 2 that the pins (210,212) have their heads arranged so that the pinheads also covers [sic.] an area extending beyond a region of contact between the pin heads and the object." Final Office Action, p. 3, lines 2-4.

Again, we must respectfully disagree. Chu '385 Fig. 2 shows pistons 210 and 212, which are in contact with chip 204. These pistons are not, therefore, arranged in an area extending beyond a region of contact between the pin heads and the object, in the manner of Applicants' claim 12. For example, in at least one embodiment, the "area extending beyond a region of contact between the pin heads and the object" includes pins that do not contact the object. See, e.g., pins 12 and object 14; FIG. 2. Chu '385 does not teach or depict such an arrangement.

Although we believe that claim 12 patentably differs from Chu '385 "as is", for the sake of clarity, claim 12 is amended to recite pin heads arranged in a geometric pattern that covers an area extending beyond a region of contact between the pin heads and the object such that that one or more of the pin heads outside the region of contact are non-contacting with the object.

Chu '385 does not teach or depict pin heads arranged in a geometric pattern that covers an area extending beyond a region of contact between the pin heads and the object such that one or more of the pin heads outside the region of contact are

non-contacting with the object. Chu '385 therefore fails under 35 U.S.C. §102(b). Withdrawal of the Examiner's rejection, and allowance of claim 12, are respectfully requested.

Claim Rejections - 35 U.S.C. §103

Claims 18, 23 and 24 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Chu '281 in view of U.S. Patent No. 5,920,457 ("Lamb"). Given the claim cancellations made in Applicants' Response of September 12, 2005, claim 11 stands rejected as being unpatentable over Chu '281 and Lamb in view of U.S. Patent No. 5,394,299 ("Chu '299"). Claims 5, 10 and 21 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Chu '281, Lamb and U.S. Patent No. 4,153,107 ("Antonetti"). We respectfully disagree with each of these obviousness-type rejections.

Claim 18: Regarding claim 18, the Examiner notes that nonobviousness cannot be shown by attacking references individually where the rejections are based on combinations of references. *In re Keller*, 642 F.2d 413, 208. The Examiner further states that "Lamb was not relied on to teach that pin heads are flush with the face of the spring but to disclose that the sponge spring material is a thermal conductive material." Final Office Action, p. 4, ¶1.

The Examiner's comments appear to be directed to Applicants' prior remarks. Applicants argued that both Chu '281 and Lamb failed to disclose pin heads that are flush with the face of a spring element. Regardless of the Examiner's reasons for using Lamb, if both references used in a §103 rejection fail to teach a common element of a claim, then the combination fails to teach or suggest all the claim limitations. Per MPEP §2142, the combination cannot render the claim *prima facie* obvious.

However, despite our belief that the combination of Chu '281 and Lamb does not render claim 18 *prima facie* obvious "as is", in hopes of advancing this application to allowance, claim 18 is amended to recite "...utilizing a spring element formed of thermally conductive material with a substantially planar face, a flat endmost surface of each of the pin heads being substantially flush with the face." As noted herein above with respect to claim 2, Chu '281 does not teach, suggest or depict such a

limitation, instead specifying that a header back is positioned next to a resilient material. The Chu '281 header back is not an endmost surface of the header. See Chu '281, col. 4, lines 7-8, quoted herein above, and FIG. 4.

Lamb also fails to teach, suggest or depict flat endmost surfaces of pin heads being substantially flush with a face of a thermally conductive spring element. Indeed, Lamb makes no mention of pin heads at all.

Because Chu '281 and Lamb both fail to teach or suggest a spring element...with a flat endmost surface of each of the pin heads substantially flush with the face of the spring element, the combination fails to teach or suggest each and every element of claim 18. The combined patents therefore fail to establish a *prima facie* case of obviousness. Withdrawal of the Examiner's rejection is respectfully requested.

Claims 23 and 24: The courts have ruled that if an independent claim is nonobvious under 35 U.S.C. §103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071.5 USPQ2d 1596 (Fed. Cir. 1988). Thus, claims 23 and 24, which depend from claim 18, are non obvious for at least this reason. Withdrawal of the Examiner's rejections, and allowance of each of claims 18, 23 and 24 is respectfully requested.

Claim 11: Claim 11 stands rejected as being unpatentable over Chu '281 and Lamb in view of Chu '299. Again, we must respectfully disagree with the rejection.

Claim 11 depends either from claim 2 or from claim 12. Chu '281 in view of Lamb and Chu '299 fails to teach each and every limitation of amended base claims 2 and 12, and therefore cannot render claim 11 *prima facie* obvious.

For example, with respect to amended base claim 2, neither Lamb nor Chu '299 teach or suggest a thermal transfer interface including pin heads, wherein a flat endmost surface of each of the pin heads is substantially flush with the face of a spring layer. Again, Lamb makes no mention of pins or pin heads. Lamb cannot, therefore, teach or suggest pin heads with front surfaces that are flush with a spring layer. Chu '299 also fails to teach or suggest this limitation. Therefore, even if one combined Chu '281 and Lamb with the Chu '299 purported teaching of rectangular

passageways, the combination would not teach each and every limitation of claim 2. In particular, the combination would not include flat endmost surfaces of pin heads being substantially flush with a face of a spring layer. Claim 2 is therefore nonobvious in view of the combined patents.

Likewise, amended base claim 12 is nonobvious over Chu '281 in view of Lamb and Chu '299. Chu '281 does not teach or suggest pin heads extending beyond a region of contact between the pin heads and the object, at all. For example, none of the pin headers shown in Chu '281 extend beyond a region of contact with a chip. See, e.g., Chu '281 FIGs. 1 and 3-5. Chu '281 especially fails to teach an area including at least one pin head that does not contact an object (as in claim 12). Rather, Chu '281 specifically recites "Each of the pin-pistons 24 has a head or header 26 at the end thereof which contacts the chip 12 surface". Chu '281 col. 3, lines 34-35.

Lamb, as noted, is silent as to pins or pin heads. Chu '299 fails to teach or suggest pin heads arranged in a geometric pattern covering an area that extends beyond a region of contact between pin heads and an object, wherein at least one pin head does not contact the object. For example, each of Chu '299 figures shows pistons 18 contacting a chip (e.g., chip 22). None of the pistons are shown outside of the region of contact between the pin heads and the object. Amended claim 12 is therefore also nonobvious in view of the combined patents, at least because the combination fails to teach or suggest the limitation discussed herein.

Again, if an independent claim is nonobvious under 35 U.S.C. §103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071.5 USPQ2d 1596 (Fed. Cir. 1988). Claim 11 depends from either claim 2 or claim 12. Both claims 2 and 12 are nonobvious; therefore, claim 11 is therefore also nonobvious over Chu '281 in view of Lamb and Chu '299. Withdrawal of the Examiner's rejection, and allowance of claim 11, are respectfully requested.

Claims 5, 10 and 21: Claims 5, 10 and 21 stand rejected as being unpatentable over Chu '281 and Lamb in view of Antonetti. Respectfully, we must again disagree.

The Examiner recognizes that Chu '281 and Lamb do not disclose the limitation of a vent coupled to a passageway, as in claims 5, 10 and 21. However, the Examiner contends that Antonetti teaches a vent 34, and states that it would have been obvious "to use Antonetti's teaching in the combination device of Chu '281 and Lamb for the purpose of filling or venting out the gas." Final Office Action p. 7, ¶2. We disagree, for at least the following reasons.

Respectfully, the Examiner's interpretation of Antonetti appears to rely on hindsight. For example, there is no indication, anywhere within Antonetti, that structure 34 is a vent. The Examiner appears to improperly interpret the patent – assuming limitations not explicitly taught by Antonetti – in order to render Applicants' claims 5, 10 and 21. Applicants respectfully remind the Examiner that this is impermissible hindsight under 35 U.S.C. §103. The statute specifically requires that, in order to establish *prima facie* obviousness, the combined patents must teach or suggest all of the claim limitations. See MPEP §2142.

Reference number 34, see FIG. 1, is not defined in Antonetti, as a vent or otherwise. The Examiner assumes that it is a vent for filling in or venting out helium gas. Respectfully, we disagree. A vent is defined as "an opening permitting the escape of fumes, a liquid, a gas, or steam." The American Heritage® Dictionary of the English Language, 4th Ed., © 2000, Houghton Mifflin Company. Structure 34 is depicted as closed off from the open space between substrate 12 and cap 16. There is absolutely no indication in Antonetti that it is capable of opening to the space between substrate 12 and cap 16. Structure 34 cannot, therefore, permit the escape of gas.

Further indication that structure 34 is not be a vent is found in Antonetti. Antonetti requires a "gas encapsulated module". Antonetti, col. 2, line 43. We contend that a vent would thwart the aim of providing gas encapsulation, as the gas would escape through a vent. Furthermore, Antonetti requires that "Helium gas...fills the voids in the interface 28 between the thermal conductive piston elements 26 and chips 10. Likewise, the helium gas 32 fills the gap 30 between the periphery of the thermal conductive piston element 26 and the wall of the hole 20 thus forming a gaseous thermal conductive interface...Thus, *the pressure interface* 28 containing a thermal conductive inert gas in the voids provides a low-resistance to the heat transfer and, accordingly, provides a high heat conductive interface." Antonetti, col. 3, lines

12-35, emphasis added. If structure 34 were a vent, and indeed, if Antonetti included any type of vent, the gap would not be filled with Helium and a pressure interface could not be provided, because the helium gas would diffuse through the vent.

On the other hand, Applicants' claim 5 clearly requires a ventilated metal block. Claims 10 and 21 likewise require a vent for venting pressure from a passageway. Such venting may, for example, facilitate compression of the spring.

These elements are not taught or suggested by Antonetti; indeed, Antonetti teaches away from venting by requiring both a pressure interface 28 and a gas encapsulated module. The combination of Chu '281, Lamb and Antonetti therefore fails to teach or suggest all of the elements of Applicants' claim 5 and claims 10 and 21. *Prima facie* obviousness is not established. Withdrawal of the Examiner's rejection, and allowance of claims 5, 10 and 21, are respectfully requested.

New claims 26, 27 and 28, 29 depend respectively from claims 5 and 21. Because the combination of Chu '281, Lamb and Antonetti does not render base claims 5 and 21 obvious, new dependent claims 26-29 are also nonobvious. As previously noted, if an independent claim is nonobvious under 35 U.S.C. §103, then any claim depending therefrom is nonobvious. *In re Fine*. We thus submit that new claims 26-29 are allowable for at least this reason. However, new claims 26-29 include additional elements that are not taught or suggested by the combined patents.

For example, new claims 26 and 28 recite that venting pressure from a passageway comprises venting overpressurization from a thermally conductive material in the passageway. New claims 27 and 29 depend, respectively, from claims 26 and 28, and recite ventable thermally conductive materials. The combination of Chu '281, Lamb and Antonetti does not teach or suggest venting overpressurization from a thermally conductive material in a passageway, nor do they teach or suggest such thermally conductive material comprising one or more of a thermally conductive grease, gas, air or other thermally conductive medium. Claims 26-29 are therefore additionally patentable over the combined patents. The Examiner's consideration and allowance of claims 26-29 are respectfully requested.

We note that new claims 26-29 are fully supported by the specification. For example, "Gaps 64 (and/or cavities 65) may be filled with thermally conductive

grease, gas, air or other thermally conductive medium". Specification, p. 8, lines 2-4. "A small vent 67 may be included within end 62 as a matter of design choice to vent over-pressurization of material in cavity 65; vent 67 is shown with only one passageway 58A for ease of illustration even though system 50 may include multiple vents 67 as a matter of design choice." Specification, p. 7, lines 7-10 of ¶[0038].

CONCLUSION

In view of the above Remarks, Applicants have addressed all issues raised in both the Advisory Action dated September 29, 2005 and in the Final Office Action dated July 12, 2005. Applicants thus respectfully solicit a Notice of Allowance for all claims 2, 5, 10-12, 18, 21, 23, 24 and 26-29. Should any issues remain, the Examiner is encouraged to telephone the undersigned attorney prior to any subsequent Office Action.

This Amendment and Response is filed concurrently with a Request for Continued Examination, a Petition for One Month's Extension of Time, and authorization to charge the requisite associated fees to Deposit Account No. 08-2025. No fees are believed due for the four (4) new dependent claims are added herewith, because fifteen of the originally filed claims have been cancelled (1, 3-4, 6-9, 13-17, 19-20 and 22). However, if any additional fee is deemed necessary in connection with this Amendment and Response, please charge the aforementioned Deposit Account.

Date: 14 Nov 2005

By Curtis Vock

Curtis Vock, Reg. No.: 38,356
LATHROP & GAGE, L.C.
4845 Pearl East Circle, Suite 300
Boulder, Colorado 80301
Tele: (720) 931-3011
Fax: (720) 931-3001